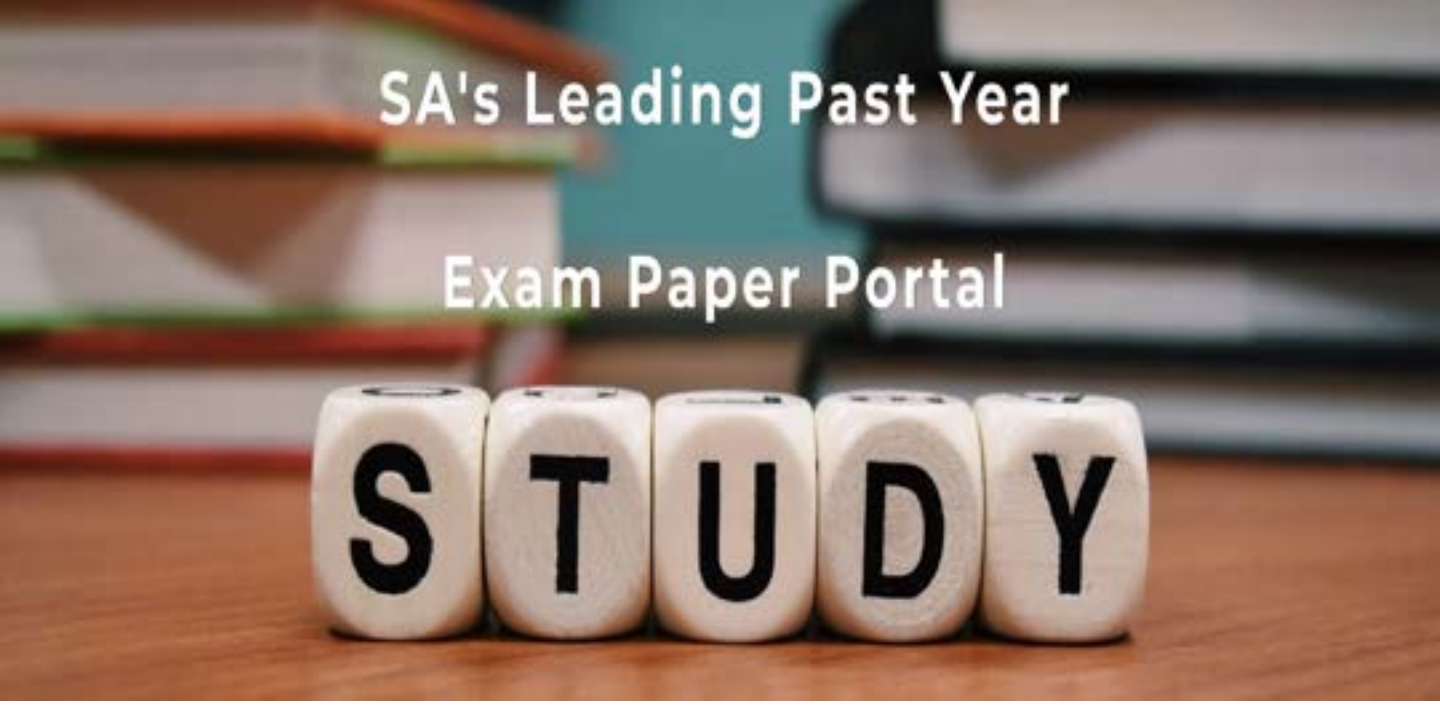

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AGRICULTURAL SCIENCES

EXAMINATION GUIDELINES

GRADE 12

2021

These guidelines consist of 34 pages.

TABLE OF CONTENTS

1. INTRODUCTION

The *Curriculum and Assessment Policy Statement (CAPS)* for Agricultural Sciences outlines the nature and purpose of the subject Agricultural Sciences. This guides the philosophy underlying the teaching and assessment of the subject in Grade 12.

The purpose of these Examination Guidelines is to:

- Provide clarity on the depth and scope of the content to be assessed in the Grade 12 National Senior Certificate (NSC) Examination in Agricultural Sciences.
- Assist teachers to adequately prepare learners for the examinations.

This document deals with the final Grade 12 external examinations. It does not deal in any depth with the school-based assessment (SBA).

These Examination Guidelines should be read in conjunction with:

- *The National Curriculum Statement (NCS) Curriculum and Assessment Policy Statement (CAPS): Agricultural Sciences*
- The National Protocol of Assessment: *An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding the National Protocol for Assessment (Grades R–12)*
- The national policy pertaining to the programme and promotion requirements of the National Curriculum Statement, Grades R–12

2. ASSESSMENT IN GRADE 12

2.1 Formal assessment in Grade 12

In grade 12 formal assessment (SBA) constitutes 25% and is set and marked internally and moderated externally. The remaining 75% of the final mark for certification in Grade 12 is set, marked and moderated externally

FORMAL ASSESSMENT: GRADE 12			
TERM 1	**TERM 2**	**TERM 3**	**CERTIFICATION MARK**
Task-based assessment 1: 25% Controlled test: 75%	Task-based assessment 2: 25% Mid-year examination: 75%	Trial examination: 100%	**SBA:** weighting **Task-based assessment** Practical investigation: 10 Assignment: 10 **Test-based assessment** Controlled test: 20 Mid-year examination: 30 Trial examination: 30 **Total: 100** **Examination external** **Total: 300**
100	**100**	**100**	**Total certification mark: 400**

2.2 Format of the question papers for the external examinations in Grade 12

In Grade 12 the formal school-based assessment (SBA) constitutes 25% of the final mark. It is set and marked internally and moderated externally. The remaining 75% of the final mark for certification in Grade 12 consists of a national examination which is set, marked and moderated externally. This external examination consists of TWO PAPERS of 150 marks each. The grand total is 300 marks.

The basic outline of these papers is indicated below:

PAPER 1			
Duration: 2½ hours			
MAIN TOPICS	**SECTION A**	**SECTION B**	**TOTAL MARKS**
• Animal Nutrition • Animal Production, Protection and Control • Reproduction	**QUESTION 1** **45** Multiple choice, terminology, matching items and term replacement	**QUESTIONS 2–4** **105** (35 marks/question) Each of the main topics per question	**150**

PAPER 2			
Duration: 2½ hours			
MAIN TOPICS	**SECTION A**	**SECTION B**	**TOTAL MARKS**
• Agricultural Management and Marketing • Production factors • Basic Agricultural Genetics	**QUESTION 1** **45** Multiple choice, terminology, matching items and term replacement	**QUESTIONS 2–4** **105** (35 marks/question) Each of the main topics per question	**150**

Basic format and outline of the national question papers for Agricultural Sciences P1 and P2.

SECTION A FOR PAPER 1:

This section consists of multiple-choice questions, matching items, terminology and term-replacement questions. There must be an equal distribution of marks for these questions between the main topics (Animal Nutrition, Animal Production, Protection and Control and Reproduction). Each of the main topics will be allocated 15 marks. Learners need to know the terminology involved in each topic.

The following provides an indication of the format, layout, instructions, number of questions per subquestion and mark allocation for SECTION A:

SECTION A

QUESTION 1

There will be four different types of short questions in the following sequence:

Multiple-choice questions:

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

FOUR possible answers are provided per question and indicated as follows:

1.1.1 A cost-effective protein supplement for a ruminant animal is …

A fish meal.
B cottonseed oil cake meal.
C urea.
D carcass meal.

ANSWER:

1.1.1 C

Distribution of marks for this question:
- Animal Nutrition: 8
- Animal Production & Protection: 8
- Animal Reproduction: 4

Each question paper will have TWO combination-type questions.

In this question, learners may be expected to arrange items in the correct sequence, e.g. Rumen→ abomasum → omasum → reticulum)

1.1.1→1.1.10 (10 x 2) (20)
Each subquestion carries 2 marks out of 20.

Matching-item questions:

1.2 Indicate whether each of the descriptions in COLUMN B applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN A. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 B only.

TWO answers indicated by A and B in COLUMN A and a description indicated in COLUMN B.

EXAMPLE:

COLUMN A			COLUMN B
1.2.6	A:	Heartwater	A protozoan disease transmitted by a tick
	B:	Redwater	

ANSWER:
1.2.6 BOTH A and B

Distribution of marks for this question:
- Animal Nutrition: 4
- Animal Production & Protection: 4
- Animal Reproduction: 2

1.2.1→1.2.5 (5 x 2) (10)
Each subquestion carries 2 marks out of 10.

Terminology questions:

1.3 Give ONE word/term/phrase/concept for each of the following descriptions. Write only the word/term/phrase/concept next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

EXAMPLE:
The most common bacterial disease that affects the udder and milk production

ANSWER:
Mastitis

Distribution of marks for this question:
- Animal Nutrition: 2
- Animal Production & Protection: 2
- Animal Reproduction: 6

1.3.1→1.3.5 (5 x 2) (10)
Each subquestion carries 2 marks out of 10.

Term-replacement questions:

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make the statements TRUE. Write only the correct word(s) next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

EXAMPLE:
Farm animals are poikilothermic animals with a constant body temperature that is normally slightly higher than that of its surrounding environment.

ANSWER:
Homoeothermic

Distribution of marks for this question:
- Animal Nutrition: 1
- Animal Production & Protection: 1
- Animal Reproduction: 3

1.4.1→1.4.5 (5 x 1) (5)
Each subquestion carries 1 mark out of 5.

[45]

SECTION A FOR PAPER 2:

This section consists of multiple-choice questions, matching items, terminology and term-replacement questions. There must be an equal distribution of marks between the main topics (Agricultural Management and Marketing, Production Factors and Basic Agricultural Genetics) for these questions. Each of the main topics will be allocated 15 marks. Learners need to know the terminology involved in each topic.

The following provides an indication of the format, layout, instructions and number of questions per subquestion and mark allocation for SECTION A:

SECTION A

There will be four different types of short questions in the following sequence:

QUESTION 1

Multiple-choice questions:

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

FOUR possible answers are provided per question and indicated as follows:

This process involves the production of the product and moving it to consumers:

A Marketing
B Processing
C Standardisation
D Grading

ANSWER: A

Distribution of marks for this question:
- Agricultural Marketing: 8
- Production Factors: 8
- Basic Agricultural Genetics: 4

Each question paper will have TWO combination-type questions.

In this question, learners may be expected to arrange items in the correct sequence, e.g. Strengths → opportunities → threats → weaknesses

1.1.1→1.1.10 (10 x 2) (20)
Each subquestion carries 2 marks out of 20.

Matching-item questions:

1.2 Choose a term/phrase from COLUMN B that matches a description in COLUMN A. Write only the letter (A–H) next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 L.

EXAMPLE:

COLUMN A	COLUMN B
1.2.1 Ability and desire to buy goods and services	A. Supply
	B. Demand
	C. Elasticity of demand

ANSWER:
1.2.1 B

Distribution of marks for this question:
- Agricultural Marketing: 4
- Production Factors: 4
- Basic Agricultural Genetics: 2

1.2.1→1.2.5 (5 x 2) (10)
Each subquestion carries 2 marks out of 10.

Only EIGHT items marked A to H are given in COLUMN B as distractors for the descriptions in COLUMN A.

Terminology questions:

1.3 Give ONE word/term/phrase/concept for each of the following descriptions. Write only the word/term/phrase/concept next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

EXAMPLE:
1.3.1 A legally binding agreement between the employer and the employee

ANSWER:
1.3.1 Contract

Distribution of marks for this question:
- Agricultural Marketing: 2
- Production Factors: 2
- Basic Agricultural Genetics: 6

1.3.1→1.3.5 (5 x 2) (10)
Each subquestion carries 2 marks out of 10.

Term-replacement questions:

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make the statements TRUE. Write only the correct word(s) next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

EXAMPLE:
1.4.2 <u>Mutants</u> is a group of genes of which each adds to the value of certain phenotypic characteristics.

ANSWER:
1.4.2 Multiple alleles

Distribution of marks for this question:
- Agricultural Marketing: 1
- Production Factors: 1
- Basic Agricultural Genetics: 3

1.4.1→1.4.5 (5 x 1) (5)
Each subquestion carries 1 mark out of 5.

[45]

SECTION B FOR PAPER 1:

All questions are COMPULSORY and EACH question must be started on a NEW page ('Start this question on a NEW page.').

QUESTION 2: ANIMAL NUTRITION

This question is derived from animal nutrition content and is assessed through data-based questions based on diagrams, pictures, case studies or scenarios, calculations, graphs, tables, schematic representations, flow charts and other forms of stimulus.

Questions covering most of the main content areas, numbered 2.1, 2.2, 2.3, etc. with subquestions numbered as follows:

2.1
- 2.1.1
  - (a)
  - (b)

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences.

Total marks **[35]**

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

This question is derived from animal production, protection and control content and is assessed through data-based questions based on diagrams, pictures, case studies or scenarios, calculations, graphs, tables, schematic representations, flow charts and other forms of stimulus.

Questions covering most of the main content areas, numbered 3.1, 3.2, 3.3, etc. with subquestions numbered as follows:

3.2
- 3.2.1
  - (a)
  - (b)

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences.

Total marks **[35]**

QUESTION 4: ANIMAL REPRODUCTION

This question is derived from animal reproduction content and is assessed through data-based questions based on diagrams, pictures, case studies or scenarios, graphs, tables, schematic representations, flow charts and other forms of stimulus.

Questions covering most of the main content areas, numbered 4.1, 4.2, 4.3, etc. with subquestions numbered as follows:

4.3
- 4.3.1
- 4.3.2

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences.

Total marks **[35]**

GRAND TOTAL: 150

SECTION B FOR PAPER 2:

All questions are COMPULSORY and EACH question must be started on a NEW page ('Start this question on a NEW page.').

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

This question is derived from agricultural management and marketing content and is assessed through data-based questions based on diagrams, pictures, case studies or scenarios, calculations, graphs, tables, schematic representations, flow charts and other forms of stimulus.

Questions covering most of the main content areas, numbered 2.1, 2.2, 2.3, etc. with subquestions numbered as follows:

2.1
    2.1.1
        (a)
        (b)

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences.
Total marks **[35]**

QUESTION 3: PRODUCTION FACTORS

This question is derived from production factors and is assessed through data-based questions based on diagrams, pictures, case studies or scenarios, calculations, graphs, tables, schematic representations, flow charts and other forms of stimulus.

Questions covering most of the main content areas, numbered 3.1, 3.2, 3.3, etc. with subquestions numbered as follows:

3.2
    3.2.1
        (a)
        (b)

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences.

Total marks **[35]**

QUESTION 4: BASIC AGRICULTURAL GENETICS

This question is derived from basic agricultural genetics and is assessed through data-based questions based on diagrams, pictures, case studies or scenarios, calculations, graphs, tables, schematic representations, flow charts and other forms of stimulus

Questions covering most of the main content areas, numbered 4.1, 4.2, 4.3, etc. with subquestions numbered as follows:

4.3
    4.3.1
    4.3.2

Content areas are indicated in annual teaching plan of the CAPS document for Agricultural Sciences.

Total marks **[35]**

GRAND TOTAL: 150

2.3 Cognitive level weighting

The table below provides a guide for the cognitive level weighting applicable to Paper 1 and Paper 2. The key verb is used as a guide to judge the appropriate cognitive level of a question. The context of the question will provide more details to measure the level of difficulty of a question to place it at the most appropriate level. The marks per cognitive level need to reflect the overall cognitive balance as a percentage (40% knowledge, 40% comprehension and application and 20% analysis, synthesis and evaluation) for each of the question papers. The cognitive levels will be made to scaffold within a question.

Cognitive levels, context words and key verbs for Paper 1 and Paper 2:

COGNITIVE LEVEL WEIGHTING %	CONTEXT WORDS	KEY VERBS
A **40%**	***Knowledge***	Name, State, Give, Indicate, Provide, Arrange, Define, Label, List, Outline, Locate, Recognise, Select
B **40%**	***Comprehension and application***	Describe, Identify, Restate, Review, Summarise, Classify, Compare, Define, Distinguish, Interpret, Match and Select, Apply, Calculate, Draw, Explain, Identify, Illustrate, Prepare, Operate, Practice, Solve, Draw (Sketch), Modify, Adapt, Compute, Discover, Survey, Gather, Prepare, Use, Show
C **20%**	***Analysis***	Analysis, Categorise, Compare, Distinguish, Discuss, Examine, Investigate, Test, Deduce, Relate, Classify, Contrast, Explain, Generalise, Predict, Solve
	Synthesis	Arrange, Compose, Formulate, Organise, Plan, Assemble, Construct, Combine, Create, Depict, Design, Develop, Incorporate, Integrate, Invent, Predict, Produce, Structure
	Evaluation	Appraise, Assess, Comment on, Critically analyse, Evaluate, Conclude, Interrogate, Judge, Predict, Compare, Score, Justify, Critique, Recommend

THE LEVEL OF DIFFICULTY

Each of the cognitive levels A (basic knowledge), B (comprehension and application) and C (analysis, synthesis and evaluation) is mainly determined by the key verbs used in the questions. The level of difficulty for each of these categories must also be judged based on the context of each question. The level of difficulty will fall into three different categories for each of the cognitive levels, namely difficult, moderate and easy. The weighting of these categories should be equal for each of the cognitive levels.

The following contextual issues need to be considered when assessing a question for its level of difficulty:

- The detail of the knowledge or concepts required in the responses
- The amount/quantity of knowledge or concepts that is needed in the responses
- The complexity of the knowledge or concepts that is required in the responses
- The types and complexity of skills needed to complete the question
- The complexity of the phrasing of a question
- The level of extended thinking needed to respond to a question
- The basic context of a question

Each of the contextual issues above needs to be carefully evaluated in each question to make a judgement on the level of difficulty of a question. This classification of questions needs to be justified by the expected performances and perception of candidates to them.

Refer to previous question papers for some examples in this regard.

3. ELABORATION OF THE CONTENT FOR GRADE 12 (CAPS)

The tables below provide a brief outline of the content coverage for Paper 1 and Paper 2. The total marks for each of the main topics need to be added together for each paper to measure the content distribution of each paper.

PAPER 1	
Main topic	**Mark allocation**
• Animal Nutrition	50
• Animal Production, Protection and Control	50
• Animal Reproduction	50
TOTAL MARKS	**150**

PAPER 2	
Main topic	**Mark allocation**
• Agricultural Management and Marketing	50
• Production factors	50
• Basic Agricultural Genetics	50
TOTAL MARKS	**150**

Basic skills linked to the subject:

Questions in both Paper 1 and Paper 2 test the following skills:

- Ability to follow instructions
- Identifying labels/Labelling/Drawing/Diagrams/Schematic representations
- Plotting and interpretation of graphs/data
- Working out and interpreting calculations
- Organising/Recording and categorising data
- Extraction and/or manipulation and/or evaluation of data
- Hypothesis testing/Formulation/Using scientific methods

SECTION B FOR PAPER 1:

All questions are COMPULSORY and EACH question must be started on a NEW page ('Start this question on a NEW page.').

QUESTION 2: ANIMAL NUTRITION

Questions covering most of the main content areas, numbered 2.1, 2.2, 2.3, etc. with subquestions, e.g. 2.1.1.

The following aspects of the content will be assessed: (Remember this is just to indicate key areas of focus, but it should be read in conjunction with ATP in the CAPS document.)

(a) Calculations:

Learners are expected to know FIVE calculations in Paper 1, namely **digestibility co-efficiency**, **nutritive ratio (NR)**, **Pearson square**, **energy values** and **feed flow**, but will be assessed for a minimum of TWO calculations in the question. Further to the ability how to calculate, learners are expected to explain the results of the calculated values in feeding and be able to apply and relate the results to practical feeding practices (situation on the farm).

NOTE:

Calculations
Generally, the criteria used for assessing calculations are as follows: • Correct formula • Substitution of values • Simplifying the values • Answer and correct units • Proportionality (e.g. fodder flow) • Interpretation of the results calculated (Relating results to daily farming practices)

(b) Components of feeds: Attention should be paid to the following with regard to minerals and vitamins:
- Key: TWO – importance
- Key: Deficiency

(c) Types of feeds:
- Learners will be assessed on FOUR examples from each subdivision of the main types of feed (four examples of protein-rich and carbohydrate-rich concentrates, four examples of protein-rich and carbohydrate-rich dry roughages).
- Learners are expected to know the importance of feeding in each example of the main group, e.g. the suitability of lucerne hay against maize stock.

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences. [35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Questions covering most of the main content areas, numbered 3.1, 3.2, 3.3, etc. with subquestions, e.g. 3.1.1.

The following aspects of the content will be assessed: (Remember this is just to indicate key areas of focus, but it should be read in conjunction with ATP in the CAPS document.)

(a) It is important to delineate between the:
- Production systems and farming systems
- Farming systems and the scale of production (subsistence farming, small-scale production/commercial farming and large-scale production)

(b) Basic housing and equipment for various animals under intensive conditions at different stages of production:
- Chickens
- Pigs (general facilities in a pig house, facilities for breeding pigs)
- Dairy (milking parlour)

(c) Sheltering structures for various purposes:
- Sheltering against adverse conditions (natural and build structures)
- Sheltering structures for storage (feed sheds)

(d) Handling of animals:
- Equipment and facilities (cattle, sheep and pigs)
- Design features of the handling facilities (cattle, sheep and pigs)
- Tools and equipment (examples of such tools/equipment used to perform various management practices such as castration, dehorning, shearing, milking, hoof trimming, vaccination, weighing, docking, ear tagging, injections in pigs, sheep and cattle)
- Behaviour of these animals when handled (pigs, sheep, chickens and cattle)
- Guidelines to handle (poultry, pigs, sheep and cattle)

(e) Learners are expected to plot a line or bar graph on the basis of the following criteria:

Graphs
• Correct heading with both variables • Correct type of graph • Correct units, e.g. OC • Y-axis: Correct labelling and calibration • X-axis: Correct labelling and calibration • Plotting (80% and more correct plotting)

NOTE: The graph can be in any of the three questions in SECTION B.

Learners may be expected to interpret the plotting by:
- Identification of certain aspects
- Deducing the trends
- Making recommendations

(f) **NOTE: For examination purposes diseases will be assessed as indicated in the table below:**

TYPES OF DISEASES			
VIRAL	**BACTERIAL**	**PROTOZOAN**	**FUNGAL**
Rabies, swine flu, avian flu	Mastitis, Anthrax	Heartwater, Coccidiosis	Ringworm
RVF, NCD, FMD	TB	Anaplasmosis, Redwater	Lumpy wool

ASPECT
1. Type of animal infected
2. Transmitting agent
3. Key symptom
4. Control
5. Preventative measures
6. Economic implications
7. Role of state in preventing diseases

NOTE: For examination purposes, parasites will be assessed as indicated in the table below.

TYPES OF PARASITES	
INTERNAL	**EXTERNAL**
Liver fluke, roundworm	Nasal worm, ticks, blowflies
Tapeworm	Mites, lice

ASPECT	
EXTERNAL	**INTERNAL**
1. Concept: external parasite	Concept: internal parasite
2. Examples of external parasites	Groups of parasites
3. Life cycles (single/two/three host ticks)	Life cycles
4. Control	Symptoms
5. Preventative measures	Preventative and control measures
6. Economic implications	Financial implications
7. Role of the farmer in controlling external parasites	Role of the farmer in controlling the parasites

Content areas are indicated in annual teaching plan of the CAPS document for Agricultural Sciences. [35]

QUESTION 4: ANIMAL REPRODUCTION

Questions covering most of the main content areas, numbered 4.1, 4.2, 4.3, etc. with subquestions, e.g. 4.1.1.

The following aspects of the content will be assessed: (Remember this is just to indicate key areas of focus, but it should be read in conjunction with ATP in the CAPS document.)

(a) Diagrams:
- Identification of parts and functions of the reproductive systems (bull or cow)
- Primary and secondary organs (bull and cow)

(b) Reproductive processes/techniques:

(i) Formation of gametes
- Concepts (oogenesis, spermatogenesis)
- Diagrams: flow diagrams

(ii) Oestrus cycle
- Stages
- Hormonal control
- Signs of heat (visible, behavioural)
- Synchronisation of oestrus
- Super ovulation

(iii) Courtship/Mating

(iv) Artificial insemination (AI)
- Concept
- Equipment and tools
- Collection of semen
- Dilution and dilutants
- Storage
- Requirements for a successful AI
- Technique

(v) Fertilisation
- Concept
- Process illustrated in a diagram

(vi) Pregnancy/Gestation
- Concept
- Duration
- Hormone responsible
- Stages of pregnancy/gestation
- Multiple births
- Embryo flushing
- Embryo transfer
- Problems of pregnancy

(vii) Parturition/Giving birth
- Signs of giving birth
- Stages
- Hormone responsible

(viii) Lactation
- Phases
- Hormonal control
- Lactation curve

Content areas are indicated clearly in the annual teaching plan of the CAPS document for Agricultural Sciences. [35]

CONTENT MAPPING FOR PAPER 1

ANIMAL STUDIES: PAPER 1 (Animal Nutrition)

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Animal nutrition	• Compare the external structure of the alimentary canal of a ruminant (cow and sheep) and a non-ruminant (fowl and pig) • Functions and adaptations of various structures of the alimentary canal • Description of the internal structure of the rumen, reticulum, omasum, abomasum and small intestines	Examples of questions in previous question papers
Digestion in non-ruminants (pig/fowl) and ruminants (cow)	**Digestion in non-ruminants** • A brief explanation of the intake of feed • The mechanical and/or chemical (enzymes) digestion processes in the mouth, stomach, small intestine and the large intestine • Functions of the salivary glands, the liver, pancreas and intestinal glands (accessory glands) **Digestion in ruminants** • Definitions of rumination, regurgitation and peristalsis • Explanation of the intake of food and the chewing of the cud (swallowing and re-swallowing) • The differences in size and functionality of the four stomach compartments of a mature ruminant compared to a young ruminant **Digestion in the rumen** • Describe rumen microbes as single-celled organisms found in the reticulorumen • Briefly classify the different types of rumen microbes • Specific functions of different bacteria (cellulytic, proteolytic, amylolytic) • Describe the most important requirements for normal functioning of rumen microbes/microorganisms • Name the functions of the rumen microbes • Explain the direct absorption of food in the rumen and small intestine directly by osmosis, diffusion and active transport into the blood stream	Examples of questions in previous question papers Examples in previous question papers
Components of feed	• Briefly describe the functions (importance) of water, proteins, carbohydrates (sugar, starch and crude fibre) and fats/oils (ether extract) in animal production and growth • Indicate the basic bio-chemical functions, importance and deficiencies of the macro-elements (calcium, phosphorus, magnesium, sodium, chlorine, potassium and sulphur) and trace-elements (iron, iodine, zinc, selenium, copper, cobalt) • Briefly indicate the basic functions and two deficiencies of water-soluble vitamins (B1; B2 ; B6 and B12/Vitamin B complex) and fat-soluble vitamins (A, D, E and K)	Examples of questions in previous question papers

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Digestibility of feeds	• Define the digestibility and digestibility coefficient of feeds • List the factors that affect/influence/determine the digestibility of feeds and explain their impact on digestibility • Describe the methods used to improve/increase the digestibility of feeds • Understand the different steps in the calculation of digestibility coefficient, interpretation and implication of calculated values	Examples of questions in previous question papers
Quality of feed, energy value of feeds and nutritive ratio	**Quality of feed: biological value of proteins** • Define the concepts: biological value (BV), essential amino-acid index and ideal proteins • Explain the importance of animal proteins in rations • Evaluate a feed protein in terms of biological value (egg protein and milk protein) **Energy value of feed** • Name the units in which energy value is expressed • Define and outline gross energy, metabolic energy, digestible and net energy • Describe the purpose/aims of calculating energy value of the feed • Identify and draw a schematic representation of feed energy flow • Use formulae to calculate the feed energy flow and interpret the results **Nutritive ratio** • Define the concept of nutritive ratio (NR) • Describe the purpose/aims of the nutritive ratio in animal feeding • Use different formulae to calculate and interpret the nutritive value of a feed	Examples of questions in previous question papers
Types of feed	• Illustrate the basic classification of animal feeds • Define roughages and concentrates • Name the characteristics of roughages and concentrates • Describe the different types of roughages and concentrates • Make a schematic representation of different types of animal feeds • Importance of roughage and concentrates as feeds for different types of animals (ruminants and non-ruminants)	Examples available in previous question papers

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Subdivision of feeds **Planning a feed flow programme**	• Compare and give examples of protein-rich and carbohydrate-rich feeds **Supplements to rations** • Indicate the different ways of supplementing: minerals, vitamins, non-protein nitrogen and growth stimulants **Planning a feed flow programme** • Define and describe a feed-flow programme, maintenance and production ration • A brief overview of the Pearson square method (feed formulation) • Calculate and draw the feed requirements using a single Pearson square method • Interpret the Pearson square results for feed mixtures • Conversion of the feed ratios into kilograms and percentages • Interpret and describe fodder/feed flow/fodder production planning • Explain the importance of fodder flow/fodder production planning • Do a basic calculation of a feed/fodder flow program for a group of livestock (number of animals and feed needed over a period of time)	Examples of questions in previous question papers

QUESTION 3

Animal Production, Protection and Control

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Animal production **Increasing animal production**	**Animal production systems** • Describe and compare between intensive and extensive animal production systems • Distinguish between small-scale and subsistence, large-scale and commercial farming systems, subsistence and commercial	Examples of questions in previous question papers
Intensive farming	• Study examples of intensive farming productions including broiler production, battery system, feedlots and a piggery • Describe how factors, like nutrition/feeding, environment, reproduction/breeding and general enterprise management are used to increase animal production under intensive farming (broiler production)	Various examples of questions in previous question papers
Extensive farming	• Study examples of extensive farming productions including sheep farming, beef production and poultry production • Describe how factors like nutrition/feeding, environment, reproduction/breeding and general enterprise management are used to increase animal production in extensive farming (beef production)	Examples of questions in previous question papers
Animal shelter/ Protection/ Housing	• Give the importance or reasons for shelter/housing • Identify different structures used for sheltering/housing livestock in an intensive animal production system • Identify and describe different intensive production systems, like a backyard system, intensive/semi-intensive system and a free range system for poultry, pigs or dairy production • Explain the basic housing or shelter requirements/guidelines for an intensive production system, like a holding shed, feed shed and holding pens • Identify and describe the different equipment/tools for intensive housing systems, like feeders, water supply, bedding and lighting	Examples of questions in previous question papers Examples of questions in previous question papers
Behaviour and handling of farm animals	**Behaviour of farm animals** • Describe the common behaviour of cattle, sheep, pigs and poultry under various conditions **Handling of farm animals** • Give the reasons/importance of handling farm animals • Describe the effect of incorrect handling on farm animals (harm and effect) • State the basic guidelines for handling cattle, sheep, pigs and poultry • Identify and describe the different techniques/tools/aids/facilities (design features, e.g. loading ramps, crush, vehicle) utilised to handle farm animals • The basic guidelines/requirements for transporting/moving farm animals from one farm to another/abattoirs	Various examples in previous question papers

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Animal diseases and protection	**Animal health** • Describe the signs of poor health/sick animals (cattle, pigs and chickens) • Name and describe the methods of testing animal health • Various methods of administering medicine to animals (cattle, sheep, pigs and chickens) • Describe the sustainable use of medication • Distinguish between infectious, non-infectious and metabolic animal diseases • Identify and distinguish between the levels of seriousness of animal diseases (chronic, per-acute and acute) **Animal diseases** • Indicate the main micro-organisms causing diseases in animals • Identify the most important diseases in South Africa based on the mode of transmission, animal host, symptoms and control measures	Various examples of questions in previous question papers
Viral and bacterial diseases	• Evaluate viral diseases, like foot and mouth disease (FMD), rabies, Rift Valley fever (RVF), avian/bird flu, swine fever/flu and Newcastle disease (NCD) • Explain bacterial diseases prescribed, such as anthrax, mastitis and tuberculosis (TB): transmission, host, symptoms and control measures	Various examples of questions in previous question papers
Protozoal and fungal diseases	• Indicate protozoal diseases, like anaplasmosis, redwater, heartwater and coccidiosis • Describe fungal diseases, like lumpy wool and ringworm • Identify and explain the economic implications of these animal diseases • Describe the preventative/control measures for animal diseases	Various examples of questions in previous question papers
Internal parasites/ Endoparasites	• Define the term internal parasite • Identify and describe the main groups of internal parasites, like tapeworms, liver fluke and roundworms • Describe the life cycles, animal hosts, symptoms and treatment of tapeworms, liver fluke and roundworms • Explain the financial implications and detrimental effects of internal parasites • Describe the basic preventative/control measures of internal parasites	Various examples of questions in previous question papers
External parasites/ Ectoparasites	• Define the term external parasite • Distinguish between ticks, nasal worm, blowflies, lice and mites as examples of external parasites • Identify and describe the life cycles of ticks (single/two/three host ticks), nasal worm (sheep) and blowflies, lice and mites (sheep) • Explain the financial implications and detrimental effects of external parasites • Describe the basic preventative/control measures of external parasites	Various examples of questions in previous question papers
Plant and metallic salt poisoning	• Identify and describe the maize fungus, poison bulb, thorn apple as examples of plant poisoning • Discuss the treatment of animals suffering from plant poisoning • Describe the preventative/control measures of plant poisoning • Identify and describe common salt and urea poisoning (the symptoms and treatment) • Indicate the preventative/control measures of salt poisoning • Describe the basic principles of good health to control animal diseases and parasites/pests • Indicate the role of the state in animal protection	Various examples of questions in previous question papers

QUESTION 4

Animal Reproduction

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Animal reproduction **Male and female reproductive systems**	**Reproductive organs of cattle** • Distinguish between the primary and secondary male reproductive organs/structures • List the functions of the testes, epididymis, scrotum and the accessory sex glands (vesicular glands; prostate; Cowper's gland) • Describe the process of sperm formation (spermatogenesis) and make a schematic representation of spermatogenesis • State the factors causing sterility and infertility in bulls • Identify and describe the primary and secondary female reproductive organs (structure) • Indicate the functions of the ovaries, Fallopian tubes, uterus and vagina • Describe the process of ovigenesis/oogenesis and make a schematic representation of ovigenesis/oogenesis	Some examples of questions in previous question papers
Oestrus and oestrus cycle	• Define oestrus or the heat period • Identify and describe the female sex hormones and their respective functions • Indicate and describe the periods/stages/phases of the oestrus cycle in cows • Noticeable signs/characteristics of oestrus in cows • Describe the practical methods dairy farmers can adopt to assist with the identifying of cows on heat	Various examples of questions in previous question papers
Synchronisation of oestrus and mating	• Define the concept of the synchronisation of oestrus/heat • Briefly describe the various techniques/methods of synchronisation of oestrus/heat • Advantages and disadvantages of synchronisation of oestrus • Describe the basic factors causing sterility and infertility in females (cows) • Define mating/copulation and ejaculation • Describe natural mating by referring to male sexual display/courtship behaviour/pattern, factors that regulate mating behaviour among bulls and the five main stages of mating/copulation	Examples of questions in previous question papers

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Artificial mating (artificial insemination, embryo transplantation and cloning)	• Define artificial insemination • Indicate the main requirements for successful AI • List the advantages and disadvantages of AI • Describe the collecting of semen by using an artificial vagina or electrical stimulation/electro-ejaculator • State the basic requirements for semen collection and storage • Describe the characteristics of good quality semen (semen evaluation) • Describe the dilutants and functions of such dilutants • Identify the correct time for artificial insemination (timing for AI) • Indicate and describe the correct technique for carrying out AI	Various examples of questions in previous question papers
Embryo transplantation/ transfer (ET)	• Identify and define embryo transplantation/transfer (ET), super ovulation, embryo flushing/harvesting, donor cows, recipient cows • Describe the aims/purposes of ET and embryo flushing/harvesting • List the advantages and disadvantages of ET	Examples of questions in previous question papers
Nuclear transfer (Cloning)	• Define nuclear transfer/cloning • List the aims/purposes of animal cloning • Distinguish between reproductive cloning and therapeutic cloning • Indicate the advantages and disadvantages of cloning	Examples of questions in previous question papers
Fertilisation and pregnancy	• Identify and define fertilisation, pregnancy/gestation, freemartins and placenta • Describe the fertilisation process • Describe the formation of multiple births (twins) and freemartins • Identify the phases/stages of pregnancy • Give the main reasons for abortions	Examples of questions in previous question papers
Birth/Parturition and dystocia	• Define parturition/birth and dystocia • Signs/Characteristics of a cow approaching parturition • State the functions of the layers covering the foetus • Indicate the stages/phases of parturition • Identify and describe the correct birth positions of a calf in the uterus just before birth • Name the conditions which interfere with normal parturition process • Describe the principal factors causing the retention of the placenta/afterbirth in cows	Some examples of questions in previous question papers
Milk production/ Lactation	• Identify and define the lactation, dry period and milk ejection • Identify and describe the structure of the udder of a cow (functions) • Discuss the milk ejection/milk let down process and hormones involved • Explain the importance and functions of colostrum for the new born calf • Identify and describe the interpretation of the lactation curve and lactation cycle (period)	Some examples of questions in previous question papers

PAPER 2

SECTION B FOR PAPER 2:

All questions are COMPULSORY and EACH question must be started on a NEW page ('Start this question on a NEW page.').

QUESTION 2: AGRICULTURAL MARKETING AND ENTREPRENEURSHIP

Questions covering most of the main content areas, numbered 2.1, 2.2, 2.3, etc. with subquestions, e.g. 2.1.1.

The following aspects of the content will be assessed as indicated: (Remember this is just to indicate key areas of focus, but it should be read in conjunction with ATP in the CAPS document.)

(a) Concepts of market and marketing
(b) Differentiation between marketing and selling:
(c) Explanation of demand/supply schedule/curves/graphs
(d) Interpretation of price elasticity of demand and price elasticity of supply
(e) Market development
(f) Types of buyers
(g) Role of Marketing of Agricultural Products Act, 1996 (Act 47 of 1996) on effective marketing
(h) Explanation of different phases of the entrepreneurial process
(i) Examples of the key components of a business plan
(j) Application of the SWOT analysis as a management tool
(k) Learners are expected to plot a line or bar graphs on the basis of the following criteria:

Graphs
• Correct heading with both variables • Correct type of graph • Correct units, e.g. R/kg • Y-axis: Correct labelling and calibration • X-axis: Correct labelling and calibration • Correct plotting (80% and more correct plotting)

Learners may be expected to interpret the plotting in terms of:
- Identification of certain aspects (equilibrium price)
- Deducing the trends
- Making recommendations

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences. [35]

QUESTION 3: PRODUCTION FACTORS

Questions covering most of the main content areas, numbered 3.1, 3.2, 3.3, etc. with subquestions, e.g. 3.1.1.

The following aspects of the content will be assessed as indicated: (Remember this is just to indicate key areas of focus, but it should be read in conjunction with ATP in the CAPS document.)

Learners will be assessed on land, labour, capital and management based on the following:

(a) All aspects involving each production factor as stipulated in the CAPS document
(b) Interpretation of the law of diminishing returns, be it a table, statement or a graph
(c) Identification of the correct labour legislation from a scenario/case study
(d) Application of the following labour legislation as they affect farmworkers under various conditions:
- Basic Conditions of Employment Act (BCEA), 1997 (Act 75 of 1997)
- Labour Relations Act (LRA), 1995 (Act 66 of 1995)
- Unemployment Insurance Act (UIA), 2001 (Act 63 of 2001)
- Employment Equity Act (EEA), 1998 (Act 55 of 1998)
- Skills Development Act (SD), 1997 (Act 97 of 1998)
- Occupational Health and Safety Act (OHSA), 1993 (Act 85 of 1993)
- Compensation for Occupational Injuries and Diseases Act (COIDA), 1993 (Act 130 of 1993)

(e) Key aspects of a contract of employment
(f) On capital, learners will be assessed on the:
- Knowledge to identify the financial records:
  - Income Statement
  - Budgets
  - Cash Flow Statement
  - Balance Sheet
  - Inventory
- Ability to interpret the data presented on these financial records:
  - Income Statement to determine:
    - Income
    - Expenditure/Costs
    - Profit/Loss
  - Budgets:
    - To distinguish between whole-farm and enterprise budgets
    - To indicate the estimated income
    - To indicate the estimated expenditure/costs
  - Cash Flow Statements to determine:
    - Income in a particular period
    - Expenditure in a particular period
    - Opening balance
    - Closing balance
    - Cash items
  - Balance Sheet to determine the:
    - Value of assets
    - Value of liabilities
    - Net worth of the business

  Learners are expected to apply the information presented in the financial records to determine:
  - Profit/Loss
  - Net worth
  - Total income
  - Total costs/expenditure

(g) Under management learners will be assessed on the:
- Identification of the applicable principles and skills based on a scenario or flow diagram
- Application of knowledge to identify the sources of risk based on the information presented, whether in a flow diagram or a statement

Content areas are indicated clearly in the annual teaching plan of the CAPS document for Agricultural Sciences [35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

The following aspects of the content will be assessed as indicated: (Remember this is just to indicate key areas of focus, but it should be read in conjunction with ATP in the CAPS document.)

Questions covering most of the main content areas, numbered 4.1, 4.2, 4.3, etc. with subquestions, e.g. 4.1.1.

Background knowledge from Grade 10 content on the biological concepts (plant and animal cells and cell division [mitosis and meiosis]) is key in this question.

Learners will be assessed on the implication of the principles of breeding:

(a) Key genetic concepts/terminology genetics, heredity, genes, chromosomes and alleles (homozygous and heterozygous)
(b) Distinction between the following: genotype and phenotype, dominant and recessive genes
(c) Ability to do a monohybrid cross and how it relates to Mendel's law of segregation
(d) Ability to do a dihybrid cross and how it relates to Mendel's law of independent assortment
(e) Use the Punnett square, schematic diagrams and pedigree diagrams to solve genetic problems
(f) Punnett square will be assessed as follows:

EXAMPLE:

Punnett square

	b	B ✓
B	Bb	BB
b ✓	bb	Bb ✓

MARKING CRITERIA:
- Populated Punnett square ✓
- Correct gametes for Parent 1 ✓
- Correct gametes for Parent 2 ✓
- Correct offspring ✓

(g) Distinguish between qualitative and quantitative characteristics as it relates to variation
(h) Application of the patterns of inheritance that lead to different phenotypes of Inheritance in agriculture environment
(i) Heritability as:
- Concept
- Implication in breeding

(j) Biometrics
- Understanding of statistical values to generate breeding values
- Interpretation of the knowledge of breeding values for future breeding

(k) Breeding systems learners will be assessed based on:
- Indication of the terminology (inbreeding, line breeding, crossbreeding, upgrading, species crossing, outcrossing)
- Interpretation of flow diagrams on different breeding systems, patterns of inheritance
- Interpretation of information on multiple alleles and the effect of polygenes in enhancing a heritable characteristic
- Identification of the breeding systems based on the examples given in the statements
- Stating advantages or disadvantages of the products of that breeding system

(l) Importance of variation and selection for breeding in agriculture
- Identification of external (environmental) and internal (genetic) causes of variation in a scenario or statements
- The types of mutagenic agents and their effects
- Changes in chromosome structure
- Natural versus artificial selection

(m) Understanding of the concept genetic modification/engineering
- Its application to agriculture (plants and animals), aims, techniques, risks and benefits

Content areas are indicated in the annual teaching plan of the CAPS document for Agricultural Sciences. [35]

AGRICULTURAL MANAGEMENT AND MARKETING, FACTORS OF PRODUCTION AND BASIC AGRICULTURAL GENETICS: PAPER 2

Agricultural Management and Marketing

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Agricultural marketing	• Define the market/marketing • Distinguish between marketing and selling • List, identify and describe the main functions of agricultural marketing (transport, storage, packaging and processing/value adding) • Price determination and supply/demand • Define and describe supply and demand • Explain and interpret the law of supply and demand (the interpretation of the supply and demand curve/graph) • Identify and explain the factors influencing the supply and demand of a product • Identify and describe the price elasticity of supply/demand and price inelasticity of supply/demand	Examples of questions in previous question papers
Market equilibrium	• Define market equilibrium • Interpret a hypothetical supply and demand curve to indicate market equilibrium • Interpret the market equilibrium • Describe the development of a market • Describe the importance of a market with regard to fixed prices, types of buyers and methods to promote products • List the approaches to marketing, including niche marketing, mass marketing and multisegment marketing • Identify and explain sustainable agricultural marketing (green markets, eco-labelling)	Some examples of questions in previous question papers

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Agricultural marketing systems	**Free marketing** • Define the concept of free marketing • Indicate the general advantages and disadvantages of a free-market system • Identify and describe the main channels/options of free-market systems and their advantages and disadvantages (farm-gate market, fresh-produce markets, stock sales, direct marketing and internet marketing) **Co-operative marketing** • Define the concept of agricultural co-operatives and their background • Describe the principles of agricultural co-operative • Name the types of agricultural co-operatives • Describe the benefits/advantages of agricultural co-operatives **Controlled marketing** • Describe the concept of controlled marketing **Agricultural marketing chain or supply-demand chain** • Identify and describe a marketing chain/supply-demand chain • Factors that hamper the marketing chain of agricultural products • Indicate ways to streamline and improve the agribusiness chain • Briefly describe the role of legislation in the effective marketing of agricultural products	Some examples of questions in previous question papers
Agricultural entrepreneurship and business planning	• Define an entrepreneur and entrepreneurship • Describe the important aspects of the entrepreneur and entrepreneurship • Describe the entrepreneurial success factors or personal characteristics • Identify the main distinct phases of the entrepreneurial process **Agribusiness plan** • Define and outline a business plan • Identify and indicate the reasons for drawing up a business plan in the agricultural sector • Outline the standard format and layout (components) of an agricultural business plan • Indicate the problems encountered when drawing up an agribusiness plan • Identify electronic resources used as a tool for drawing up an agribusiness plan • Describe a basic SWOT analysis	Some examples of questions in previous question papers

Factors of production

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Agricultural factors of production **Land and labour**	**Land** • Identify the functions of land (in economic terms) • Indicate the economic characteristics of land as a factor of production • Describe the techniques/methods of increasing land productivity **Labour** • Define the term labour • Describe the different types of labour in agriculture (with relevant examples) • Identify and describe the problems associated with labour in agriculture • Indicate the methods for increasing labour productivity • Identify the labour legislation (Acts) affecting farmworkers in South Africa (LRA, BCEA, OHSA, COIDA and SDA) • Describe the standard format and layout (components) of a labour/farmworker contract	Some examples of questions in previous question papers
Capital	**Capital** • Define the following terms: capital, assets, cash flow, budgets • Identify and describe the types of capital (with relevant examples) • List the methods of creating capital • Identify and describe the sources of finance/credit (long-term, medium-term and short-term credit) • Indicate the problems associated with capital as a factor of production • Identify and describe the capital/financial management systems, including financial records, farm asset records and farm budgets • Indicate the differences between an enterprise budget and a whole farm budget (example of farm budget) • Identify the components of a cash flow statement • Distinguish between the main aspects which are included in a Cash Flow Budget Statement • Define the concepts of farm management/management, strategic farm risk management • Identify and explain the principles/components of management • Indicate the general management skills needed to manage a farm business • Identify and describe the internal and external forces which affect/influence farming businesses • Discuss the primary sources of risk in farming business • Identify and discuss the main risk management strategies/techniques (diversification strategies, risk-sharing strategies) • Discuss the law of diminishing returns as applicable to all factors of production – interpretation of graph	Some examples of questions in previous question papers

Basic Agricultural Genetics

MAIN TOPIC	SUGGESTED CONTENT	COMMENTS
Basic agricultural genetics **Monohybrid inheritance** **Dihybrid inheritance**	**Genetic concepts** • Define basic genetic terminology, like genetics/heredity, genes, chromosomes and alleles (homozygous and heterozygous) • Distinguish between genotype and phenotype, dominant and recessive genes • Indicate a monohybrid inheritance/crosses (Mendel's first law: law of segregation) • Indicate a dihybrid inheritance/dihybrid cross (Mendel's second law: law of independent assortment) • Use various methods, such as a Punnett square, genetic diagrams and schematic representations to illustrate the crosses • Describe Mendel's laws of segregation and independent recombination of characteristics • Distinguish between qualitative and quantitative characteristics	Some examples of questions in previous question papers
The pattern of inheritance	• Identify and describe the pattern of inheritance that leads to different phenotypes: incomplete dominance, co-dominance, multiple alleles, polygenic inheritance and epistasis • Define the concept of prepotency and atavism with relevant examples • Describe the sex chromosomes and sex-linked characteristics (examples)	Some examples of questions in previous question papers
Variation and mutation	• Define genetic terminology, like variation, mutation and selection • Identify and describe the importance of variation and selection • Discuss the external (environmental) and internal (genetic) causes of variation • Identify the types of mutagenic agents and their effects (changes in chromosome structures)	Some examples of questions in previous question papers
Selection	• Indicate the general principles of selection, like biometrics, heritability and estimated breeding values (EBVs), and compare natural and artificial selection • Indicate the selection methods used by plants and animal breeders (mass, pedigree, family and progeny selection) and breeding values • Identify and describe inbreeding, line-breeding with relevant examples, cross breeding, upgrading, species crossing, out-crossing and the advantages and disadvantages of these different breeding systems	Some examples of questions in previous question papers
Genetic modification/ genetic engineering	• Define the concept of genetic modification/genetic engineering in plants and animals (with relevant examples) • List the aims of genetic modification of plants and animals • Indicate the advantages of genetic engineering over traditional methods • Identify and describe the current uses/application of genetically modified plants • Indicate the techniques used to genetically modify plants/animals • Describe the potential benefits of genetically modified crops • Name the characteristics of GMOs • Indicate the potential risks of GMOs	Some examples of questions in previous question papers

4. CONCLUSION

This Examination Guidelines document is meant to articulate the assessment aspirations espoused in the CAPS document. It is therefore not a substitute for the CAPS document which educators should teach to.

Qualitative curriculum coverage as enunciated in the CAPS cannot be over-emphasised.

NOTE: Any information taken from any supporting documents such as textbooks, journals and even these guidelines should be verified for accuracy and correctness before use in order to avoid dissemination of misleading facts that are not scientifically and practically tested.